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The Philadelphia Papers

It can be presumed that the 31 preprints we have received of Papers presented to the recently-held Philadelphia meeting of the American Foundrymen's Association represent a fair cross-section of the total of 53 communications read thereat. If this be so, then it is obvious that now, unlike pre-war days, a better balanced service is being given to the industry. An analysis shows that five enter the field of grey iron, five cover the subject of malleable, there are five also for steel and for light alloys and three for the copper-base alloys. Then there are two dealing with sands and refractories and a further six which enter into no specific classification. There are no outstanding Papers amongst these preprints and in this respect they typify the current technical output throughout the world. During and just after the war, there was a plethora of real novelties emanating from both this country and the U.S.A. Now science and technology seem to be consolidating the ground won. More and more systematic research is coming from the research institutes and departments of the large industrial corporations, and this year's vintage indicates that something approaching half emanates from these sources.

Amongst the Papers which appealed to us as being of real merit was "Conventional versus Salt-bath Hardening of Cast Iron Cylinder Linings," by Mr. G. M. Lahr, because it serves to remind one that a simple means is available to enhance the engineering properties of castings, and, moreover, one capable of much development. Then, in the malleable field, there is a Paper by Schneidewind and Reese on "Pearlitic Malleable Irons, Plain and Alloyed." Here extensive researches are correlated with existing American standard specifications, and pointers are disclosed for better practical results. Amongst the light-alloy group of Papers there is a good Paper on "The Effect of Gating Design on Metal Flow Conditions in the Casting of Magnesium Alloys," by Mr. E. Eliott and Mr. J. G. Mezoff. Work has been done to show that, with poor gating conditions, a stream of metal can suck in gas through the sand of the runner cavity, if that cavity be not completely full, and thus cause defects in the casting. In the steel section, a Paper by Brinson and Duma on "Knock-off Risers" has taken the subject much further. This system can only be applied to high melting point alloys, as success must depend on the heating up of the sand which restricts the diameter of the riser to such an extent that no early freezing takes place at this point. The subject is certainly worth pursuing, as the potential economies in the dressing shop are of a high order. The limitations of the system are clearly set out for a given application. Shakespeare was responsible for asking "What's in a name?" The Duke of the Middle Ages is nowadays in some countries called a "Commissar." This came to mind when reading a Paper on "The Modernisation of the 'Small' Foundry" by Mr. Lester B. Knight. The author's definition of a "small" foundry is one employing between 25 to 100. We think that most of our readers would regard these as medium, but somehow a jobbing foundry with, say, 75 men is still small, whereas a mechanised foundry with the same number of employees would certainly be medium. However, Mr. Knight has made a really worthwhile contribution to a fascinating subject.

Technical institutes are not inventors. They faithfully record year by year the developments made in the industries they service. The level of the contributions they publish depends on the technologists of those industries and what they will produce is unpredictable. However, there are cycles, and a peak was reached in all countries during the 1944 to 1946 era. It will possibly be a few years before these conditions are repeated.

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A Duplication of Effort

The decision of the West Bromwich Education Committee to set up a joint committee to formulate a training scheme to attract youths to foundry work, has been received with surprise by the West Midland Foundry Advisory Committee, which has been working with a similar aim since its formation at the end of 1946.

On behalf of the Advisory Committee, Mr. D. Howard Wood has stated that his committee existed for the recruitment and training of labour for all types of foundries in Warwickshire, Staffordshire, Worcestershire, Shropshire and Herefordshire. A joint committee had been set up at Tipton, including equal numbers of employers and trade union officials, to act as a liaison between the education authority and the parents of the boys leaving school.

The number of trainees at present engaged in the foundry industry was 933 and there was an annual intake of 850. More than 120 firms in the West Midlands had given an undertaking to operate schemes for the production of skilled craftsmen.

The chairman of the West Bromwich Education Committee (Councillor A. Medley), however, stated that there was a definite lack of organised training schemes for young workers in foundries, and a Government official had recently told them the Government was alarmed at the lack of new entrants.

W. H. Whittle Foundation

The Council of the Institute of Vitreous Enamellers announce that the second competition for the Whittle Silver Medal and cash prizes is being held. The purpose of the competition is to encourage junior chemists and other technicians in the enamelling industry to put their ideas into the form of a written Paper. Any subject connected with the industry may be chosen.

The assessors are desirous that Papers submitted for this competition should deal with subjects connected with the industry in a particular and not a general manner. For instance, preference would be given to a Paper dealing with, say, "The Causes of Fish-scaling" rather than a Paper dealing with "The General Faults of Vitreous-enamel Finishes."

The Paper should be from 3,000 to 4,000 words, with the necessary illustrations, and must, of course, be written entirely by the competitor, although experimental work done by others can be referred to with due acknowledgment. Care must be taken to see that information given in the Paper is not confidential, and competitors are advised to submit their Papers to their company for approval before sending them in for consideration.

Though the competition is primarily intended for junior staff, 30 years of age or under, yet where a competitor has been on active service or away from the industry on war service of another kind, and this is stated in a covering letter, the time on such service will be subtracted from his actual age and taken into consideration by the assessors. All Papers must be submitted by December 31, 1948.

A Foundry Brochure

Somewhat belatedly, owing to war conditions, the Widnes Foundry & Engineering Company, Limited, Widnes, have issued a well-illustrated brochure to mark the completion of a hundred years of service primarily to the chemical industries. The firm was founded in 1841 as Robinson & Cook, the former a blacksmith and the latter a local, but obviously substantial, tradesman. Blacksmiths were highly-paid craftsmen in those days and Robinson could earn six golden sovereigns a week, which, if sold to-day on the black market, would fetch about £42, or about £2,000 a year. Moreover, he would pay no income tax! However, he worked really hard, and at one time walked 20 miles a day going to and returning from his work. There must have been a housing shortage in the 1830's—possibly a hang-over from the Napoleonic wars! Under his management, which virtually lasted until his death in 1901 (he was then about 87 years), the firm prospered and it made profits. Then during the 1930 slump there were losses and the firm was reconstructed. Since that time it has again made material progress.

The brochure is excellently produced and the letterpress is particularly well written. The illustrations, too, are good, but the reviewer has suggestions for improvements. The first is that the plant warrants a more modern type of ladle than is illustrated, as most of those depicted look old-fashioned. The second is an objection to the use of the cupola-shell as a blackboard. If a blackboard be needed, then one should be supplied. The fettler's cigarette gives a bad impression; make a comparison of this picture with one of the good-looking girl engaged upon welding and the lesson will be obvious. Finally, more care should have been given to the translation of the titles into other languages. In general, the illustrations for the engineering side are much the better.

Beyond these few criticisms, the reviewer has nothing but praise and he congratulates the publicity department on the production of a really high-grade brochure.

A News Service for Foundries

A news service for the foundry industry, designed to draw public attention to the achievement of British foundries through the national and provincial Press, the American and Canadian Press, and the radio, has been sponsored by the four associations—Institute of British Foundrymen, Association of Bronze and Brass Founders, British Steel Founders' Association, and the Light Metal Founders' Association. The organisation, entitled the Foundry Information Committee, is at the service of all foundry organisations, who are invited to send to the News Editor any news items of general public interest for circulation to the Press. In particular the Committee would like to receive news of big orders from overseas, new developments in foundry work, and personal stories about foundrymen and their achievements. Items should be addressed to the News Editor, Foundry Information Committee, 49, Wellington Street, London, W.C.2.

Practical Aspects of Machine Moulding*

Survey of Moulding Machines, their applications, and operational details

By J. H. Peers

To-day in most modern production foundries, moulds are produced either from matched plates or from twin cope and drag plates, this equipment being mounted on power moulding machines for speedy and economical production. Cast double-sided plates, too, are another means whereby satisfactory repetition production can be achieved. The power moulding machine is the heart of a production foundry. It offers quantity production which far outstrips hand moulding; moulds which are true to pattern; and in return for intelligent supervision it lends itself to the closest control.

There are many types of machines on the market to-day, and many claims are made by the manufacturers as to their application, but it is maintained that the right choice of machine for the job in hand is a matter of practical experience. The most important factor to bear in mind when choosing a machine is its versatility, which, of course, is largely influenced by the size and range of castings produced. It is better to have too big a machine than to use a smaller machine and overload it; also it is infinitely better to have a machine which lends itself to adaptation than to have a specialised machine which will make only a limited range of jobs.

Machine construction is also worthy of some consideration, since it usually operates under the worst possible conditions. Totally enclosed working parts, together with simplicity and sturdiness of design, should be deciding factors, since all practical foundrymen must be familiar with the abrasive action of sand and oil and the general rough usage of the machines by the operators. Some manufacturers, having studied their subject, make provision for adjustment where excessive wear takes place, thereby prolonging the life of the worn part until replacement becomes a necessity.

The source of power to operate the machine, too, has to be considered. Although "magnetic" machines and "hydraulic" machines are on the market and are used successfully, by far the most popular is the pneumatic machine, not so much because it is superior, but because pneumatic power finds universal application in a production foundry. The array of machines at the founder's disposal to-day speaks well of the manufacturers' desire to further this relatively new era in an industry which ranks amongst the oldest in our world. Broadly speaking, these various machines can be divided into types or classes, of which the Author proposes to consider each in the light of his experience.

Sandslingers

The Sandslinger is an electrically-operated machine, which elevates sand from ground level and rams it into a moulding box by means of a ramming head. It crawls along a specially designed track whilst doing so, picking up sand by means of an Archimedean screw during travel. It is merely a unit which rams the mould and subsequent operations must be carried out by other means, and as such, it finds its best application in a jobbing foundry, particularly where large moulds are made.

The ramming head is the most important part of a Sandslinger and consists of a high-speed impeller each blade of which, during its cycle, collects and throws a small wad of sand into the moulding box. Such is the speed of delivery that one gets the impression of a continuous stream of sand being ejected from the mouth. This head is so pivoted that it can be traversed through a wide arc to cover the maximum floor area. This method of ramming, that is, throwing sand at the pattern, as it were, closely approaches the ideal, and this has been recognised by progressive people who have divorced the ramming head from the Sandslinger and utilised it in conjunction with stripping plates for large-scale repetition production.

Jolt Roll-over Machine

The largest type of pneumatic production machine available is the jolt roll-over. It will handle medium to heavy jobs on a repetition basis, providing they are mounted on suitable pattern plates. It is possible to ram up a loose pattern on this machine (so long as it has a flat top) by placing the pattern on the jolt table inside the moulding box and after ramming and turning over, withdrawing the pattern by hand. Where the patterns are mounted, the machine will jolt and turnover and strip the pattern from the mould. Some types draw the pattern from the mould and some lower the mould away from the pattern. Which is the better way is a debatable point.

Since there is no provision for top squeezing on these heavy machines, it is as well to have a pneumatic rammer for top ramming. The best working arrangement is to have a pair of such machines so that twin plates can be used, thereby avoiding frequent pattern changes. In fact, two-part jobs are the usual practice on these machines. Given sufficient thought, three-part jobs, too, can be made quite successfully on them.

A pump casing produced in this manner presented quite a difficult proposition, both from a moulding and coring point of view, until it was decided to make it in three parts. The best position in the foundry for these machines is obviously in a crane bay. The heavy tackle used—such as empty box parts, cast-iron pattern plates, rammed half-moulds, and even metal for pouring—can be handled more expeditiously by overhead crane.

A suggested plan of a moulding floor with two roll-over machines involves a moulding gang which can be

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*An abridged version of a Paper read before the South African Branch of the Institute of British Foundrymen, Mr. J. H. West presiding.

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employed on continuous production. The object in dividing the floor space is to shorten the distance which the rammed mould has to travel, and at the same time to allow moulding to proceed without interruption in one area whilst pouring and knocking out takes place on the other side, and *vice versa*.

Jolt Squeeze Roll-over

Of the machines which cater for the medium class of work, perhaps the most versatile to the founder is the jolt squeeze roll-over machine. As its name implies, it will completely ram a mould by jolting and top squeezing, and then turn it over and strip the pattern. The machine is so constructed that in turning over the mould, the whole structure pivots through half a turn on its own axis, with the rammed mould held in the squeeze position. The squeeze cylinder then acts as a pattern draw leaving the stripped mould on the inverted squeeze head. After the mould is removed the machine turns back half a turn to its original position, completing the cycle.

With this type of roll-over, an overhead hopper can be placed directly over the jolt table, at the usual height convenient for the operator, without interfering witih the roll-over action. It is an excellent machine for making moulds where deep straight draws are encountered. For making drag parts the machine has decided advantages because the degree of ramming can be varied to suit the particular job, without having to consider the risk of drop-outs. The two drag parts for a motor barrel, from the point of view of ramming and because of the hanging mass of sand, obviously require rolling-over.

Quite a good working arrangement is to have a jolt, squeeze, roll-over for making drags and a stripper making tops and as far as possible to split the job accordingly with the minimum of lift in the top part.

Strippers

Considering the class of machines commonly known as strippers, the most outstanding unit is the under-sand frame stripping machine. Given equal conditions its mould output is probably higher than any other machine's, and for perfection of ramming it has no equal. As its name implies, the frame which carries the extra sand before squeezing is situated under the moulding box, instead of on top as in the more orthodox way of squeezing.

During the squeeze operation the pattern is pushed into the sand until its travel is arrested, when the pattern plate is in line with the moulding box face. The effect of this method is exactly opposite to top squeezing, the maximum mould hardness being at the mould face, with a gradually diminishing density towards the top of the mould. This is ideal ramming, and by increasing or decreasing the depth of the under-sand frame, it is possible to control the face hardness of the mould.

When the machine is set up for production the operator cannot vary the amount of sand which goes into each mould, so that if all other factors are constant, moulds are produced as like as peas. The only limitation of this machine is that it is unsuitable for very deep patterns, and finds its best application with patterns up to 3 in. deep.

Because of the positive thrust required to push the pattern into the filled moulding box. it is usual to use hydraulic power for these machines. A point worthy of mention here is that by stopping the travel of the pattern plate, so that the sand face protrudes $\frac{1}{32}$ in. lower than the moulding-box face, a sand joint is obtained, and, in the Author's opinion, the best way to produce a casting of clean joint outline is to bring together two sand faces, and then to add top weight just sufficient to resist the buoyancy of the molten metal.

Power-operated four-pin lift is probably the most widely used method of mould stripping to-day. It is incorporated in the jolt-squeeze machine, to make up the well-known jolt-squeeze stripper. A special feature about this type of machine is that it pushes the mould off the pattern and whether this is the best method of stripping is a debatable point. A machine exists which jolts and squeezes in the usual way, but strips the pattern down from the mould after the fashion of the under-sand frame machine, and this method has much to recommend it. It is not so exacting as the four-pin lift because no movement of the box takes place until the pattern is clear, so that, providing the mechanism for lowering away the pattern is in good order, a clean draw is assured, whereas with the four-pin lift a clean lift depends not only on the accuracy of the lifting device, but also on the precision of the moulding box.

Where cast-iron moulding boxes are used for four-pin stripping it is important, therefore, that the face in contact with the pattern plate be machined flat, and the locating pin holes be drilled at right-angles to this face, otherwise clean stripping may prove difficult, with resultant loss of production. Patterns mounted for stripping should have the maximum taper, especially in pockets and round holes. It is practically impossible to strip a green core out of a parallel round hole because of the sucking action created by a partial vacuum, as the mould leaves the plate. However, this can be overcome by drilling vents through the pattern plate at the base of the hole. There is no point in trying to strip a heavy hanging mass of sand; the correct thing to do is to use a roll-over machine.

Metal patterns are almost a necessity for this class of work, and brass is probably the best metal because of the high degree of finish which can be obtained. A hand-operated squeeze and four-pin lift is quite popular for making snap-flask moulds off twin plates. The squeeze is obtained by means of a lever system acting on the squeeze head, and the four-pin lift by a hand-cranked cam, counterbalanced with a weight.

The working arrangement is to use the machines in pairs, one operator making drags and one copes, whilst a third operator closes the mould and strips the flask. Up to 300 moulds a day can be produced from 18 x 12 snap flasks in this way.

Jolt Squeeze

Of the many and various machines available to-day, there is none so attractive to the small-founder as the pneumatic jolt squeeze. It is inexpensive to install and, from a maintenance point of view, the most economical to run. It can be operated singly to produce slip-box or snap-flask moulds off double-sided plates, or operated in pairs to produce cope and drag half-moulds either in moulding boxes or in snap flasks off twin plates.

A jolt-squeeze machine with tackle for slip-box moulding lends itself particularly well to moulding off cast plates of irregular joint line, jobs which might otherwise have to be made loose because of their design. Another means of mounting for either slip-box or snap-flask moulding is to prefabricate the pattern and then insert it into a standard pattern plate. Here care must be taken to make due allowance for the plate thickness in the construction of the pattern.

It is well known that the irregular outline of a cast plate helps to preserve the joint of the casting, because the contours of the mould faces coming in contact lock the joints, as it were. This principle can be usefully applied to what might otherwise be flat faces by stepping down the whole of the mould joint area, with the exception of a strip $\frac{1}{2}$ in. wide round the edge of the box.

Slip Box Set-up

The loss in mould capacity is usually more than compensated by the reduction in scrap due to offset castings. To complete the slip box set-up, a pouring jacket is required to prevent the mould bursting during pouring. With the straight-sided snap flask mould it is not possible to use pouring jackets, but steel bands rammed up inside the mould at the joint line will prove equally effective. Both these types of moulds should be supported by perforated and ribbed bottom plates to hold the mould rigid after the box or flask is stripped, and to allow free bottom venting. They are best stood on a hard level floor or conveyor for pouring.

These two methods of moulding are well worth serious consideration from an economical point of view. Since moulding boxes are not required, very little skill is required of the operator, pattern changing takes very little time, and the perfect sand joint obtained gives the casting a clean outline which requires very little subsequent fettling. Another useful set-up is to employ a pair of jolt squeeze machines and use twin plates. Here, half moulds are rammed in the usual manner and then rolled over and pattern drawn by hand. Moulding boxes, preferably of pressed steel for lightness, can be used, or suitably designed snap flasks. Patterns should be mounted on $\frac{1}{16}$-in. spring steel plates with wooden battens reinforcing, again for lightness.

With an operator on each machine and one coring and assembling, a good output can be obtained. The moulding box is probably more suitable because, despite the extra initial outlay on box parts, the pattern plate can be safely loaded to a greater extent than when using snap flasks, and further, more liberties can be taken during ramming. It is as well to have box parts of standard size and height, so that they are readily interchangeable. Where extra depth of mould is required, a steel frame of the required extra depth can be clipped on the standard box, these being knocked off and stacked when not in use. From experiments carried out in England for the preservation of steel moulding boxes, the process of galvanisation has been found to increase their useful life tenfold.

Core Blowers

Core-blowing machines, too, can be used to great advantage in the moulding of cores, and providing one goes to the trouble of making quality coreboxes and choosing the right type of machine, phenomenal quantities can be produced with very little trouble. The main features which recommend a core-blower are that it should be self-loading and have a blowing plate as large as possible. The blow hole should be a long narrow slot up to 12-in. long. Such an arrangement allows multiple coreboxes to be blown in one operation, the flat top of the corebox sealing that area of the blow-hole which is not directly over a core aperture. The slot can be shortened, if so required, by fitting metal inserts from inside the sand chamber.

Where coreboxes of this type are clamped during blowing by a diaphragm clamping device, attention must be paid to the area inside the corebox, which at no time should exceed the area of the diaphragm; otherwise the corebox will be forced open during the blow. The corebox equipment must be of the best quality, able to withstand the abrasive action of sand. The material most resistant to wear is cast-iron, and for small boxes, not too heavy to handle, this is no doubt the best. But when one considers that the actual blowing of the core requires but a fraction of the cycle of operations, and that the weight of the corebox may cause undue muscular fatigue to the operator during the constant repetition of stripping and assembling, it may be more advantageous to choose a lighter metal such as aluminium. This metal is much less resistant to wear, but this can be partly overcome by inserting iron wearing pieces in the corebox at points most subject to wear. Whenever possible, corebox joints should be stepped to avoid leaks and resultant wear.

Satisfactory operation of a coreblowing machine depends on compressed air being supplied in adequate volume at constant pressure. To ensure these conditions during the blowing operation, which is instantaneous, it is necessary to fit an auxiliary storage reservoir adjacent to the machine. A water trap should also be incorporated, to ensure reasonably dry air in the sand chamber. Providing outside dimensions of coreboxes are standardised, two or more jobs can be in production at the same time. A further development is to lock several coreboxes together with a tight-fitting slip jacket, thereby sealing all joints and at the same time dispensing with side clamps.

Control

The installation of moulding machines brings in its train the need for closer control in other activities in the foundry. The craftsman is no longer relied upon to produce the castings after his own fashion, but rather is each section expected to eliminate any variables within its own sphere, so that good castings are

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produced consistently, the man at the machine being merely an operator. Of sand control, it can be said that, providing one makes proper use of the knowledge available to-day on the subject, the matter is easy. By far the most successful sand for repetition machine production is a synthetic mixture of a suitable silica-sand base bonded with a good quality clay. With these materials, a sand drier, a sand mill, a water gauge and a little supervision, moulding sand of uniform characteristics is assured. Also by the correct use of the various grades of sand available, and the judicious use of a high volatile substance such as pulverised coal or pitch, the skin finish of the castings can be varied at will.

Ramming densities are controlled by fixing the number of jolts given to the mould, and by adjusting the height of the squeeze head until suitable readings are obtained on a mould hardness tester. A fluctuating air pressure will give irregular ramming densities, particularly with the heavier types of machines, and it is advisable to install a booster or receiver as close as posible to these machines, as previously described for the coreblower.

Probably the greatest need for control is to ensure that a job is correct before it goes into production, and to this end a system for checking pattern equipment is most important. Otherwise it may prove a costly venture to run a job all day and then find out that all is not well. Trial castings should then be made and either sent to the customer for approval, or marked out against an approved drawing. These trials should be made under production conditions, and it is much better to have the patternmaker in attendance so that he can appreciate and correct any minor moulding faults.

Gates and feeders, too, can be determined at the same time. These are best cast in metal and fixed to the pattern plate as an integral part of the pattern. Core sizes in relation to their prints may be noted, crushing space and clearances allowed, and general attention given to such details as may help to make the job a success in production. Although wooden patterns are used successfully for repetition production, a metal pattern is a better proposition in many ways and will invariably repay the extra initial cost. Particularly in this dry climate, where timber is apt to do strange things overnight, the metal pattern's superiority needs no further comment. It will retain its sharpness of outline even after long usage, and in imparting this quality to the casting, it will produce an article, the symmetry of which is pleasing to the eye and a good selling factor.

Wasters are inevitable in any foundry, but a serious attempt should be made to control the proportion of wasters. In order to have a clear picture of the previous day's work, it is necessary to have clearly detailed daily scrap reports showing causes of scrap and the percentage to good castings made. Without this information such an attempt could not be made because of the increased number of variables which machine moulding usually brings in its train. Sometimes it is not possible to eliminate a source of scrap entirely, having regard to the need for continuous production, but at least the report makes the foundry aware of that scrap.

Where there are two or more patterns of a kind on one plate they should be numbered, so that an inspection of the scrap will at once reveal the offending pattern. Graphs, too, can serve a very useful purpose as they show at a glance the trend of events over a period of time, as against the daily report which usually gets filed away under the heading—"out of sight, out of mind!"

Production Planning

The full benefits to be derived from repetition machine moulding can be obtained only if the machines are kept fully occupied during their working day. The operators should be engaged solely in making mould parts without the need to worry about coring, mould assembly, etc. They should be told which job to make and how many to make for their daily task. This information, of course, must be linked up with customers' requirements, and in order to assure this arises the need for production planning.

The task of this department is to serve the foundry by giving it information in advance of production, such as daily work programmes and machine loading,and after production, by relating the work done to the original estimates in a simple and easily understandable form, so that the foundry can see at a glance whether or not the machines are profitably employed. All this applies equally to the coreshop, whose daily programme should be in advance of the foundry. For what's the use of making 50 moulds if the coreshop can only supply 30 cores?

In conclusion the Author would like to say that no excuse is offered for the very practical aspect of this paper, nor for the fact that it may appear somewhat elementary, because from observations made during visits to numerous foundries it is oft-times evident that, in planning and layout, and in the right choice and use of moulding machines, good common-sense does not at all times prevail. The fundamentals of good moulding practice apply just the same, whether one moulds by hand or by machine, because they are merely the application of natural laws. It is therefore a great mistake to think that moulding machines will solve foundry problems. On the contrary, if one's moulding practice is bad, moulding machines—or any other mechanical aids for that matter—will, instead of producing good castings more quickly, invariably produce so many more wasters.

Finally, the Author expresses his thanks to Mr. Ward and Mr. Beal for photographs, to Mr. Bill for his guidance, and to the directors of African Malleable Foundries, Limited, for permission to publish this paper.

THE GENERAL MOTORS CORPORATION recently invited 1,400 children to a cinema show covering the scrap drive. Admission was by the production of a minimum of 5 lb. of scrap. As the average was 12 lb., the firm increased their stock pile by over 7 tons.

The Mechanisation of an American Malleable Foundry*

(*Concluded from page* 485.)

Moulding Practice

There are three mould conveyors which traverse the lines, shown in Fig. 5, on which moulds are produced in both vibrator and roll-over type of moulding machines. Metal patterns are used and, for large moulds, there are two men per machine. They work as a team and develop remarkable proficiency in keeping step with the conveyors on to which cope and drag sections are shifted and assembled so that the moulds reach the hot-metal stations ready to be poured.

These stations are near U-turns where the moulds start back through cooling tunnels from which fans exhaust heated air. As the cooling air is drawn from adjacent moulding area, any dust there is sucked off and these areas are well ventilated. A schematic drawing showing the relationship of these conveyors to other parts of the foundry is given in Fig. 6.

As all sand is prepared for use by conventional methods, these need not be described. Sand delivery is through an overhead system, shown in Fig. 7, and, being moist, the sand is not productive of dust. Cores are made also by conventional means and, after baking, are shifted on pallets by lift trucks to points along the mould conveyors.

Large moulds are handled on slat-type conveyors and smaller moulds on trays supported by hooks from chain conveyors. The chain lines loop back and forth through a labyrinth cooling room which is enclosed and well ventilated. As most of the cooling takes place in tunnels, and since cooling rooms have an inward flow of air, relatively little of the heat radiated from cooling metal enters working areas.

*Reproduced from the "Iron Age" by courtesy of the Editor.

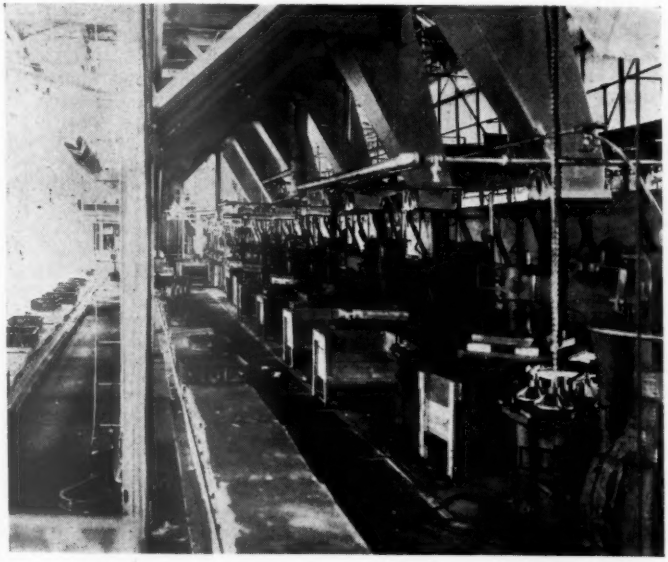


FIG. 5.—ONE OF THE THREE MOULDING LINES AND TWO OF THE MOULD CONVEYORS.

Shake-out System

As small moulds reach the shake-out, Fig. 8, they are dumped on to the unit automatically. Larger moulds are shifted on to shake-outs by air hoists on trolleys. Flasks are returned to the mould conveyors and are shifted back to points needed for re-use.

Shake-out is normally the cause of much dust, but in this case plant is located under an exhaust hood connected to a powerful exhaust system which draws air in from all sides. This air helps to cool and ventilate surrounding areas and effectively keeps dust and most of the heat away from operators. Air exhausted through the hoods is washed before discharge outside the building.

Sand falling through shake-outs is deposited on a conveyor that carries it back for re-processing. Castings are discharged on to an apron conveyor which carries them through a cooling tunnel before they arrive at a sorting area where hand hammers are used to break off sprues and runners and the white iron castings are sorted and visually inspected before being shifted into tote boxes for transfer by fork-truck to the heat-treating department. Sprues, runners and

Mechanisation of an American Foundry

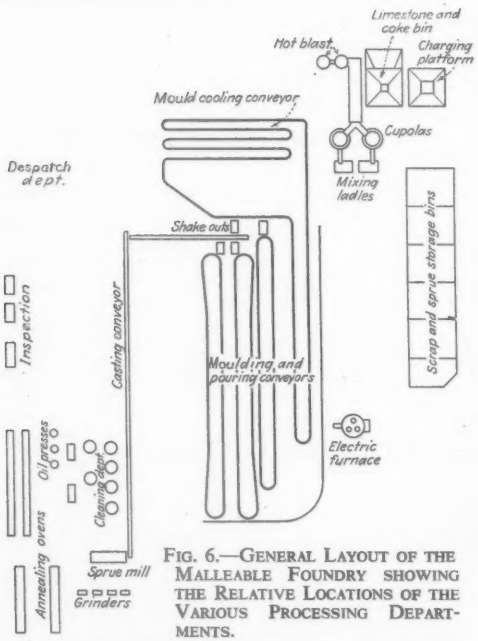


FIG. 6.—GENERAL LAYOUT OF THE MALLEABLE FOUNDRY SHOWING THE RELATIVE LOCATIONS OF THE VARIOUS PROCESSING DEPARTMENTS.

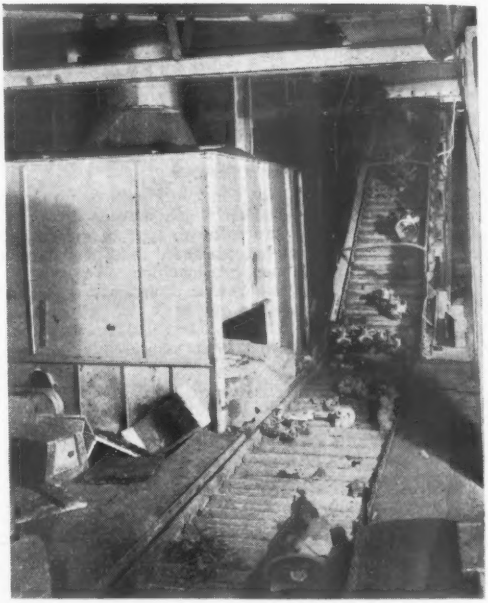


FIG. 8.—CASTINGS FROM THE HOODED SHAKE-OUT (LEFT) FEED INTO THE HOT-CASTING CONVEYOR, WHICH CARRIES THEM THROUGH A COOLING TUNNEL.

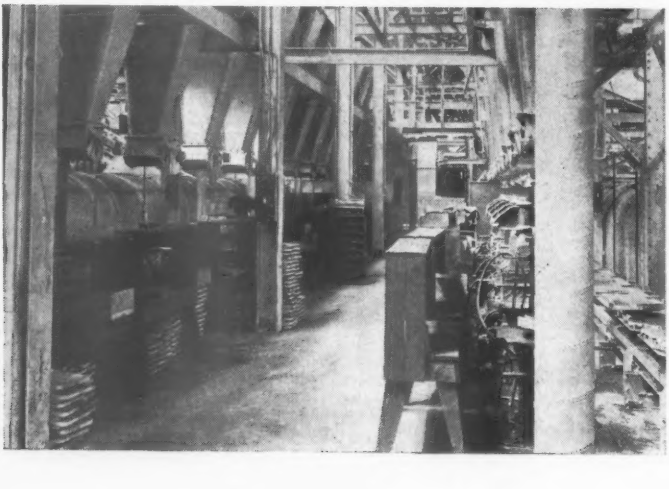


FIG. 7.—OVERHEAD SAND HOPPERS SUPPLY GREEN SAND TO THE MOULDING LINE. IN THE LEFT BACKGROUND IS ONE OF THE MOULD COOLING TUNNELS.

rejected castings continue on the conveyor to a dumping point where they are discharged for return to cupolas for remelting.

Continuous Annealing

In preparation for annealing, castings are loaded in trays on roller conveyors in line with the furnaces. At the ends of these conveyors, the trays are shifted one at a time into the furnaces, as shown in Fig. 9, which have roller hearths.

Although each of the four electric furnaces is 130 ft. long, the hearth motion is extremely slow, as the cycle requires an average of 30 hr. Charging and delivery are done automatically from roller approach and discharge platforms.

Heating is done rapidly to 955 deg. C., held for 8 hr., after which the temperature is dropped about 4 deg. per hr. to 755 deg. C. All this is done in a controlled atmosphere of partly burned propane gas which yields a mixture of CO, CO_2 and N (free of water vapour). The result is to convert the brittle white iron of the casting to malleable iron without scale formation or change in the chemical composition of the outer layer of the casting.

The furnaces each have ten zones, of which both the temperature and the atmosphere are automatically and closely controlled as indicated by recording instruments; of these there is a large panel for each furnace. In the final zone, there are cooling coils which reduce the temperature to 370 deg. C., at which the castings are discharged black and ready for such straightening as may be required.

With each batch of castings, standard test samples are cast and these are put through the annealing furnaces along with the castings and are subsequently broken to permit examination of the fractures. Quality and the efficacy of heat-treatment are judged largely by the appearance of the fractures and data as to hardness and elongation obtained from the test samples. As records of each heat and batch are prepared (including charts made from recording instruments from each heating zone of the furnaces), there is ample evidence as to the degree of uniformity secured. If a significant lack of uniformity be discovered, the reason for the variation may easily be determined and a suitable remedy applied.

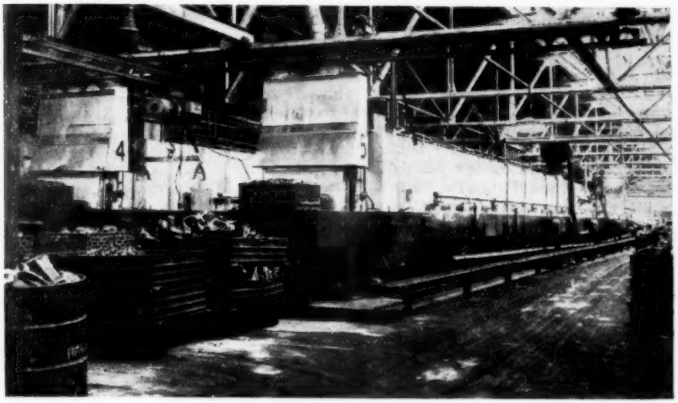


FIG. 9.—ELECTRIC ANNEALING FURNACE FROM THE LOADING END. BASKET LOADS ARE RECEIVED FROM THE ROLLER CONVEYOR AT LEFT.

Raw Materials Guide

A new edition of a booklet which first appeared in 1942 has been re-issued by the Board of Trade. It is sold through H.M. Stationery Office at 1s. 6d. No publication could better illustrate the complexities of modern business, and every executive looks forward to the time when such a work of reference will be unnecessary. At the moment, however, it is essential that businessmen should be familiar with the contents. The foundry owner, for example, is furnished with the addresses of the places he must apply to for timber, pig-iron, core oils, paper, the non-porous alloys, and most other things he buys, except coal, coke, and fuel oil.

The Institute of Physics

Dr. F. C. Toy, Director of Research, the British Cotton Industry Research Association, was elected as the new President of the Institute of Physics at its annual general meeting on May 20 last. Dr. T. E. Allibone was elected Vice-President. The honorary treasurer, Mr. E. R. Davies and honorary secretary, Dr. B. P. Dudding, were elected. Mr. J. H. Awbery and Mr. E. W. H. Selwyn were elected as ordinary members of the Board, and Dr. G. B. B. M. Sutherland was appointed by the Faraday Society as its new representative on the Board.

P.M.H. Conference

At Wolverhampton last Saturday there was held, under the auspices of the local section of the Institution of Production Engineers, a conference on Production per Man-Hour. This took the form of a well-attended full-day meeting under the chairmanship of Mr. A. J. Aiers, the president of the Wolverhampton Section. The conference was opened in the Wolverhampton and Staffordshire Technical College, by the Mayor, Alderman H. E. Lane, J.P.

Morning Session

After the opening speech there was an address by Major J. Freeman, M.B.E., M.P., Parliamentary Secretary of the Ministry of Supply, who emphasised that as Marshall aid did not give us a "free-wheel" period of four years nor even for a half-year, it was incumbent upon the nation to produce goods now for export, cheaply and in sufficient quantity. Speaking as an amateur rather than a production engineer, he suggested there were three avenues which might profitably be followed. These were (*a*) a higher degree of standardisation in the engineering industry without the sacrifice of our ability to produce a "tailor-made" job; (*b*) that production engineers should not start work when the job was in the machine-shop, they should pay attention to materials; and (*c*) stress should be laid on the human element and worker—management relations. These, he said, should aim at giving the employee the feeling that he was a necessary partner in the works organisation. The next guest speaker was M. Robert Caussin, director of the Belgian National Committee for Scientific Organisation, who dealt with Belgium's contribution to production per man-hour. He stated the reasons why Belgium had forged ahead since the war were, primarily, (*a*) the fact that there was no major reconversion in Belgium from war to peace-time production after cessation of hostilities; (*b*) that after liberation, Belgians had set immediately to work, whereas in other countries there was an attitude of relaxation, and finally (*c*) there was in Belgium adequate incentive for hard work in the shape of consumer goods for all in the shops which the people could afford to buy because they were not crippled by taxation. Belgium favoured the direct-comparison method of assessing P.M.H. efficiency.

The final speaker of the morning session was Miss A. G. Shaw, M.A., President of the Motion Study Society of Great Britain, who convincingly demonstrated the value of motion study as an aid to the elimination of waste time and physical effort. Miss Shaw reinforced her observations by lantern slides and short films showing operations "before" and "after" applied motion-study. It was obvious from the reception of this address that motion study was comparatively new to a number of the audience and that inward resolutions were being made to practise "at home" some of the principles advanced. After a short discussion on the morning's subjects, directed by the Rt. Hon. Lord Sempill, a Past-President of the Institution, the conference adjourned for luncheon.

Afternoon Session

After re-assembly, America's contribution to production per man-hour was presented by Mr. J. Y. Scott, President of the Van-Norman Company, Massachusetts, who expressed the American viewpoint on Britain's problems and detailed some of America's home difficulties. Among the salient features of his remarks it was disclosed that America is cost-conscious and mechanisation-conscious almost to the point of fanaticism; that in the States, also, there is the problem of selling the jobs to the people who say "what is the use of working faster," and that American boys, as a whole, see little point in apprenticeship schemes for skilled jobs, while highly-paid machine-minder jobs are open. Major American developments include the extension of the use of female labour, and the introduction of auto-cycle and complete-cycle machines so that components are automatically conveyed and set up for sequence operations and accuracy thus becomes mechanically independent of operators.

The last speaker of the day was Mr. B. H. Dyson, works manager of Hoover, Limited, who gave a very dynamic and thought-provoking exposition of the practical side of production per man-hour. In an attack on the orthodox P.M.H. methods and spheres of influence, he postulated that it was the non-productive departments—the stores, the drawing office, inspection department, the tool-room and so on—that were now in greater need of attention. He introduced the terms "high standard of expectancy" and "cultivation of the desire to work" as worthwhile incentives, with emphasis on personal relationships in the works as opposed to those of the "check-number" variety. Finally, he outlined some of the schemes bearing on the lines quoted above, which had been put to profitable practice at the Hoover plant, and showed lantern slides illustrating his points.

The papers were ably summed up by Mr. F. G. Woollard, Director of Birmingham Aluminium Company. He voiced his appreciation of the whole programme and introduced a personal note by his reference to the complete-cycle machines (reported on as now being developed in America) which he said were pioneered, in this country, when he was connected with Morris Motors some twenty years ago. After a brief interval for comment, the day's discussions were brought to a close, and thanks were expressed to the guest speakers, to the organisers, and to Dr. Fisher, the Principal of the College, for the facilities made available. After a short break for tea (provided by the college staff) the procedings were rounded off by the invitation of Dr. Fisher for visitors to inspect the college.

A CONFERENCE, TO BE KNOWN as the Pittsburgh International Conference on Surface Reactions,, is to be held in that city on June 6 to 11. Amongst the thirty-three lecturers are Dr. W. J. Vernon, of the N.P.L.; Mr. A. B. Winterbottom, Manchester University; Dr. A. G. Quarrell, B.N.F.M.R.A.; Dr. T. P. Hoar, of Cambridge University; and Dr. U. R. Evans, also of Cambridge. Other countries participating are France, Holland, Switzerland, and Sweden.

The Norwegian Foundry Industry

Survey of Scandinavian Industry places metallurgical use of electric power in a new perspective

*By John Sissener, Oslo**

History

The Norwegian foundry industry is very old. As far back as 1860 Norway manufactured pig-iron and steel from Norwegian ores, and charcoal. Water-wheels were used to run the forges. The foundries were located close to the charcoal blast furnaces, which provided the pig-iron.

The castings had an excellent finish, were of good design and often were real works of art, and frequently they were poured in open sand. Amongst the best known of these old foundries are *Ulefos, Bærums Værk* and *Eidsfos Værk*. The oldest steelworks in Norway is *Ness Jernværk*. Two other steelworks well known are *Stavanger Electro-Staalverk A/S* and *Christiania Spigerverk* in Oslo.

When the charcoal pig-iron could no longer compete with the production of coke blast-furnace iron, the foundries started to import their pig-iron, and remelted it in the cupola. This change took place around 1860. The last Norwegian blast furnace discontinued operations in 1895.

In Sweden, charcoal pig-iron furnaces are still in use. The pig-iron is converted into a special steel and also sold as a special foundry pig-iron. A couple of foundries also use charcoal pig-iron for ingot moulds, taking the iron direct from the blast furnaces. Moreover, electric "blast" or high furnaces and standard coke-fired blast furnaces are operated in Sweden and in Finland.

Iron Supplies

Returning to Norway, some kind of a technical revolution took place when the electric pig-iron furnace using coke was invented. Previously, in Sweden, large-scale operation of electric blast furnaces using charcoal for reduction purposes had successfully been carried out, but the replacement of charcoal with ordinary and poor-quality coke was first tried out on an industrial scale in Norway.

These large-scale experiments were carried out early in 1910-20, but the real results of practical value must be credited to *Det Norske Aktieselskap* for *Elektrokemisk Industri*, and *Christiania Spigerverk*, Oslo. By utilising the now well-known Soderberg electrode and using a furnace of simple and practical design, good results were obtained. The Soderberg electrode is self-sintering and of real efficiency for this particular application. The first very small furnace came into operation early in 1920 and the first "*Spigerverk*" furnace in 1927.

At the moment of writing, Norway is independent of import of pig-iron, thanks to this electric furnace, and is also exporting electric-furnace vanadium-titanium pig-iron used for high-grade iron castings. As a by-product, pig-iron is also made in the furnaces for aluminium oxide, smelting imported bauxite ores. The bauxite, which is contaminated with iron oxide, is treated with limestone and coke, forming calcium-aluminate and iron. Here the Soderberg electrode is also successfully employed. The following companies are now making electric-furnace pig-iron in Norway:—*Bremanger Kraftselskap*, Bergen, high-carbon titanium vanadium pig-iron; Electric Furnace Products Company, Sauda, Ryfylke, phosphoric and hematite pig-iron; Norsk Aluminium Company, Hoyanger, high-carbon hematite, relatively small production, and *Ardals Værk*, Sogn, which will soon be able to make about 30,000 tons of electric-furnace pig-iron per year.

The Norwegian Government is at present building a steel plant in the northern part of Norway, using the same electric furnace for making pig-iron in order to meet the Norwegian demand for rolled steel. This plant has caused much comment, but only time will show if it will be an economic proposition. Four furnaces, each of 18,000 k.v.a. capacity, alternatively two furnaces of 18,000 k.v.a. each, and one of 36,000 k.v.a. capacity, capable of making 200,000 tons of pig-iron yearly, all furnaces counted together, each using 400 kg. (880 lb.) coke per ton of pig-iron, are planned. Again, for the sake of completing the story, this furnace has been erected at several places in the world where local conditions are favourable to electric-furnace pig-iron production.

The Norwegian pig-iron is of a high quality. Its particular use is where a demand for a high-grade raw material exists. Usually this electric-furnace pig-iron contains 10 to 20 per cent. more carbon than coke blast-furnace pig-iron. This is one of the special properties of this iron. It has been proved that the electric-furnace vanadium-titanium pig-iron from Bremanger, when used as firebars in boilers, gives a superior heat-resistance and, when used in Diesel-engine cylinder liners, gives an excellent wear-resistance. Of course, only a few Norwegian iron-ore deposits contain titanium-vanadium, but the high carbon content seems to be an electric smelting furnace peculiarity, and it is always possible to make an alloy iron in an electric furnace by additions of oxide ores or ferro-alloys to the charge.

Moulding Sand

Turning to the next very important item for the foundation of a foundry industry, it must be admitted that Norway lacks deposits for naturally-bonded moulding sands. Even high-grade silica sand is very rare. This is, as every foundryman knows, a very great disadvantage. Sands must be imported from Denmark, England, Belgium or France. Deposits of silica sands

*The writer is Scandinavian Meehanite Representative.

The Norwegian Foundry Industry

exist and are used for ordinary work, but are lacking in refractoriness and uniformity. It is therefore very interesting to consider the huge deposits of Olivine rocks recently found on the west coast of Norway in millions of tons.

The Norwegian Olivine-stone contains approximately: 41.80 per cent. SiO_2, 50.40 per cent. MgO, 5.80 per cent. FeO, and 2.0 per cent. MnO, Cr_2O_3, Al_2O_3 and CaO, whereas the pure Olivine, called Forsterite, contains 42.69 per cent. SiO_2 and 57.31 per cent. MgO. This corresponds to the formula Mg_2SiO_4; it has a melting point of 1,910 deg. C., whereas SiO_2 fuses at 1,710 deg. C.

Experiments carried out in America, England and Norway with rats, have shown that dust from Olivine does not seem to have the same detrimental effect on the lungs as silica. The refractoriness of Olivine and the good properties from a health point of view has aroused keen interest in Norway in trying to use Olivine as a moulding sand. Three steelfoundries are now using this material exclusively for steel castings with good results. It is, however, not yet proved that the results will be good enough, as skin-finish on iron castings is to be considered. Here, also, costs play a very important part.

Norwegian Foundries

The total output of castings is small; it may vary from 40,000 to 50,000 tons a year, divided between a total of 83 ironfoundries, which is one-fifth of that of Sweden, one-half of Denmark and two-thirds that of Finland. There are also four steelfoundries with a total annual output of about 5,000 to 7,000 tons. Stavanger, *Electro Staalværk* and *Strommens Verkstel* should especially be noted for their products.

Among the ironfounders, about half the tonnage is produced by 12 to 15 foundries for specialities like heating and cooking stoves, household utensils, pipe-bends, boiler parts and hydraulic castings. A few of these foundries are heirs of the old charcoal ironfoundry industry. They are among the best and largest of Norway's foundries. The rest, making the other half of the tonnage, are all small. This consists mostly of castings for the engineering industry. This balance industry is relatively new and there are only three or four making as much as 1,000 to 2,000 tons of castings a year. An analysis shows: In the 5,000 tons a year classification, one foundry; in the 2,500-5,000 tons a year classification, one foundry; in the 1,500-2,500 tons a year classification, four foundries; in the 1,000-1,500 tons a year classification, eight foundries. The 69 other foundries are all very small; 60 per cent. of the tonnage and 60 per cent. of the foundries are located around the Oslofyord district. Five foundries, each making 30 to 70 tons a year, are located north of the polar circle.

Melting Methods

Although the cupola is used all over the country, the electric furnace of the Héroult design and a couple of Detroit rocking-arc furnaces are also used for melting iron. In the years before the war, the electric furnace could not compete with the cupola. At present, with bad coke at high prices, it is possible to compete when the yearly output is high enough to take one or two heats out of the furnace every day and the price of the current is from 0.5 to 1.5 öre per kw.-hr., which can be procured at several places. This comparison is only made as regards purely melting costs. In Sweden, however, the high-frequency furnace up to 8 tons capacity is used for melting iron, with very good results.

It must be admitted that poor cupola design and bad coke in Norway has weighted the balance too much in the favour of the electric furnace so that correct comparisons cannot easily be made until modern cupolas have been installed. The alleged superiority of the quality from the electric furnace is also founded on the same false premise. In fact, a modern cupola can make an equal and in most cases a superior iron to the electric furnace, and is, as a matter of fact, the best furnace for re-carburisation of steel scrap. Irons of 28 tons tensile strength are at present made in England in modern cupolas.

The Meehanite method has started to arouse much interest all over Scandinavia. Contrary to what has been published in Scandinavian and American foundry Press (but not the FOUNDRY TRADE JOURNAL), there is, at the time of writing, no Meehanite being produced in Sweden, that is, manufactured under licence and patents. In Norway and Denmark, licences have been granted to a couple of very well-known companies. Norway has recently started the first malleable-iron foundry at Sandnes, near Stavanger. Cupolas and electric furnaces are used.

Organisation of the Industry

In Norway there is, first of all, the *Norske Jernstoperiers Landsforening*, subsidiary of *Mekaniske Verksteders Landsforening*. This is an ironfounders' association. Then the ironfoundries have organised the so-called *Stoperiteknisk Forening*, a purely technical organisation, to organise and promote the technical training and knowledge of the foundrymen. Additionally, there is the *Teknologisk Institute*, which acts in a consulting capacity and operates an experimental foundry and a laboratory.

A third organisation is called *Norsk Stoperimesterforbund*, and admits both foremen and managers to the membership. All three organisations co-operate amongst themselves and have meetings several times a year.

Conclusion

Although the Norwegian foundry industry is small, it is very important for the country. Norway has a great shipping industry. It has the third largest commercial fleet in the world. Future development of the shipbuilding industry will depend very much on the quality and output of iron castings. Interest in the foundry industry is very keen in Government circles, but it is as hard in Norway as in any other country to get good moulders. Specialisation and concentration among the many small foundries should be the motto for the future, for only then can modern methods be applied. Healthy conditions and good-housekeeping are also among the most important items to be kept to the forefront in the future.

Correspondence

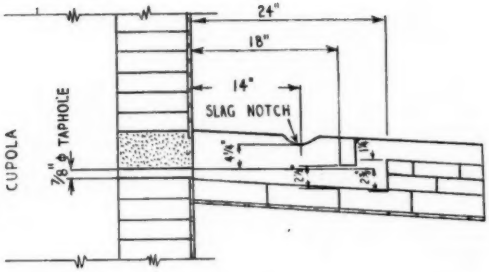
[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

MINIMUM RATE CONTINUOUS CUPOLA TAPPING

To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—In a discussion on cupola practice on page 149 in the February 12, 1948, issue of your magazine the question was raised as to the smallest tonnage possible for a continuous tap-hole cupola. The answer given was 3½ to 4 tons per hour.

We would like to call your attention to the fact that at the American Cast Iron Pipe Company, Birmingham, Ala., it has been the practice for a number of years to operate a 24-in. diameter cupola melting approximately 2,100 lb. per hour successfully. The total weight of the iron charges for this operation is 155 lb. and contain 51 per cent. steel scrap and 39 per cent. returns, the balance being ferro-alloys. The iron to coke ratio is 3½ to 1, and the blast pressure varies from 14 ozs. for the first 45 mins. to 5 ozs. throughout the balance of the melt. The reason for the high pressure at the first of the heat is to melt fast in order to fill the forehearth quickly to avoid as much temperature drop as possible. The desired spout analyses is 3.00 per cent. Si and 2.45 per cent. total carbon.



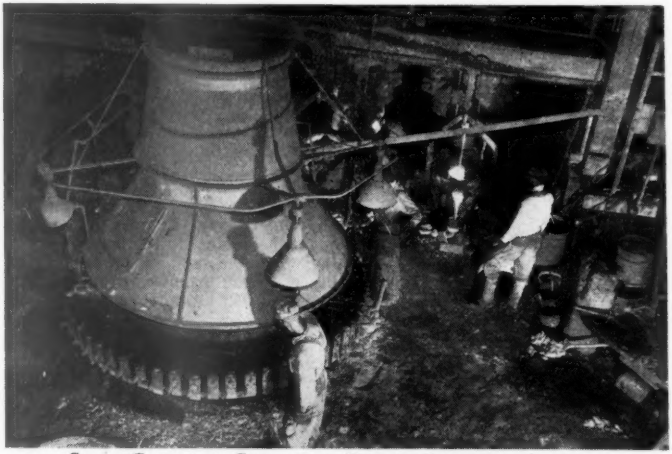
DIMENSIONS OF THE CONTINUOUS-TAPPING SPOUT.

The metal temperature at the spout varies from 1,510 to 1,535 deg. C. Molten metal collects in a 500-lb. capacity forehearth, it is then transferred from the forehearth into 30-lb. hand ladles before it is poured into chill moulds. In going through the forehearth the molten metal decreases approximately 135 deg. C. in temperature. The length of the heat varies from 8 hours to 12 hours, and no trouble is encountered with the front slagging spout whatsoever. Attached is a sketch giving the pertinent dimensions of the spout and also a picture of the operation.

Yours, etc.,

J. A. BOWERS,
Melting Shop
Superintendent.

American Cast Iron
Pipe Company,
April 21, 1948.



SMALL CUPOLA ON CONTINUOUS TAPPING SYSTEM AT AMERICAN CAST IRON PIPE COMPANY.

Liverpool Metallurgical Society

This Society has now been successfully launched with an initial membership of 120. Dr. S. J. Kennett is the first chairman, Mr. H. J. Miller, the treasurer, and Mr. C. W. J. Gellatley, of 7, Woolacombe Road, Liverpool, 16, the secretary. The annual subscription has been fixed at 10s. 6d. A programme of six lectures will be arranged for the winter session. We wish the venture the success it merits.

First International Welding Congress

By invitation of the *Institut Belge de la Soudure*, the inaugural meeting of a new international body, the International Institute of Welding, will be held in Brussels from June 8 to 11 next. It is expected that 18 countries will be represented at this gathering and invitations have been sent to welding societies in all parts of the world, inviting them to send delegates to register their adhesion to the Institute.

Workmen's Compensation

By F. J. Tebbutt

When the National Insurance (Industrial Injuries) Act, 1946, operates (from July 5, 1948), the system of workmen's compensation of the present Acts of this name is altered importantly, so that there will be a Government insurance scheme (compulsory) and there will be contribution paying. Under the Workmen's Compensation Acts, insurance (except to a limited extent to coal mining) has not been compulsory and there has been no Government insurance scheme, the liability upon employers to make payments to employees, should that occur covered by the scheme—namely, injury by accident or the contracting of an industrial disease—being continually present, although cover against all risks could be obtained through ordinary insurance companies. The new scheme covers the same matters as the old scheme as just mentioned, and the prerequisite for the injury to rank for compensation remains the same, that is, it must be one arising out of, and in the course of, the employment.

Persons Covered: Contribution Rates and Related Matters

Under the old Acts, all manual workers were within the scheme, irrespective of earnings, and non-manual workers with earnings up to £420 per annum were included. Now, practically every employee is included as there is no earnings limit for any employee. In practice, all persons under Class A of the main Act come under this Industrial Injuries scheme, but Class B (self-employed) and Class C (non-employed) persons are not included in this injuries scheme. The contributions ordinarily will be included with the stamps of the other scheme, but it should be noted that if a married woman worker elects not to be insured under the main scheme she must nevertheless be insured for industrial injuries, and so the contribution for these cases would only be at the rates for this insurance.

For industrial injuries the full rates are:—For men, if 18 years and over, 8d.; women, 6d.; boys, not 18, 5d.; girls, 4d.; but half of these amounts is recoverable from the employee. Stamps for the main and this scheme combined will therefore cost, for the four classes of persons just mentioned, 9s. 1d., 7s. 1d., 5s. 4d., and 4s. 3d., respectively, with recovery from employees of 4s. 11d., 3s. 10d., 2s. 10½d., and 2s. 4d. respectively.

Benefits

The benefit ordinarily required will be the injury benefit, this being 45s. per week plus 16s. for each adult dependant, with 7s. 6d. for eldest or only child (any other child comes under the Family Allowances scheme). Injury benefit is available for six months, when it becomes "disablement benefit," pending an assessment, which may result in a "disablement pension," in which case the amount is according to the degree of disablement, thus it can vary from 9s. per week for 20 per cent. to 45s. for 100 per cent. disablement. In cases of special hardship a disablement pension may be increased by an amount not exceeding 20s. per week (Note: The 1948 Act has increased this amount from 11s. 3d. in the 1946 Act), or, if the person is likely to remain permanently incapable of work, the pension may be plus 20s. per week. Furthermore, 100 per cent. disability pensioners may, if constant attention is required as the result of the disability, receive a further 20s. per week on this account, or even 40s. per week.

An important change is made in the payment to dependant(s) where death results. Under the old Acts the compensation was a lump-sum payment. Now, although to some dependants a gratuity is payable, the compensation (called Death Benefit) is a weekly payment (*i.e.*, a Pension). Thus, for a widow of 50, or if the dependant be a child of school age, or incapable of self-support, 30s. per week (plus, for first or only child, 7s. 6d.) is payable; otherwise the rate is 20s. per week. Other dependants who may participate are parents (parents qualify even though a widow's pension is also payable); other relatives; a woman who has cared for deceased's children; or an adult member of deceased's family. Either may be eligible for a pension or a gratuity, the granting of which is according to the degree of dependency there was upon the deceased person.

Important Matters to Note

The accident must be notified to the employer as early as possible (as now) by the injured employee (or other person), but this obligation is covered by an entry in what is known as the "accident book" (which has been kept by employers under the old scheme; the existing book can be used for the new scheme). Most firms use this method of an "accident book," but, of course, notification otherwise is acceptable.

One of the most important differences between the new scheme and the old, is that whereas under the old scheme the payments were varied according to pre-accident earnings of the injured person, the amounts now are based on the extent of the disability and the same benefits apply to all persons irrespective of the amount of their usual earnings.

Medical certificates are necessary as in the past, but insurance officers determine claims. That means, usually, if there be a doubt as to whether the injury is covered by the scheme, or whether claimant be incapable of work, an officer can refer the claim to a local tribunal, such a body being composed of representatives of employers and employees, with an independent chairman. An applicant also has a right to have his claim examined by such a tribunal if he be dissatisfied with an insurance officer's determination. Furthermore, appeals from local bodies can be made to an Industrial Commissioner

Where the question is a medical one, cases may be referred to a Medical Board or a Medical Appeals Tribunal. As regards finance, into a fund called the Industrial Injuries Fund will go all contributions and Government payments, and out of this fund will come all benefits and other amounts which are payable out of the fund.

Steel Target Now 14½ Million Tons

General Shortage Likely to Continue

An increase of 500,000 ingot tons to 14,500,000 tons in the steel industry's home production target for 1948 was announced by Mr. Douglas Jay, Economic Secretary to the Treasury, in the House of Commons. Replying to a question by Mr. Hardy, who asked whether, as steel production was now running at an annual rate of 15 million tons, allocations of steel to consumers were to remain on the basis of the target of 14 million tons, Mr. Jay replied: "No, sir; the main allocations are on a quarterly basis, and take full account of the expected supplies from home production and imports. The target of 14 million ingot tons for home production in 1948 was thought to be barely attainable, when fixed, but thanks to the strenuous and successful efforts of all concerned, the target rate has in recent weeks been exceeded. Owing to seasonal factors it is unlikely that the present rate can be maintained without interruption. There will be difficulties about raw materials, and there may be other limiting factors outside the control of the industry itself.

"The Government intends to continue helping the industry in every way to maintain the present momentum; and in view of the promising start, and the imperative need for increasing supplies, the Government has decided to raise the target for home production in 1948 to 14½ million tons. The current allocations are already being made with this increase in mind, but also with due regard to the uncertainties about imports. I must make it clear, however, that in view of the increasing demands from essential consuming industries, there is as yet no prospect of any great easement of the general shortage."

Major Guy Lloyd: "Is not one of the major limiting factors the constant threat of nationalisation?"

Mr. Jay: "No, sir, the excellent figures show that the possibility of nationalisation is having a most stimulating effect."

Changes of Name

The following companies have recently changed their names, the new titles being given in parentheses:—

WARM-GLOW HEATERS, LIMITED, Smethwick (Marsden & Batesons, Limited).

POULTON & JARNELL, LIMITED, engineers, locksmiths, etc., of Rainham (W. A. Poulton & Sons, Limited).

COTON FOUNDRY & ENGINEERING COMPANY, LIMITED, Nuneaton (Sanderson & Sons (Nuneaton), Limited).

NEWALL-SENTINEL, LIMITED, machinery and general merchants, etc., of Shrewsbury (Newall Group Sales, Limited).

ALUMINIUM DIE CASTINGS (ERDINGTON), LIMITED, Birmingham (Aluminium Die Castings (Birmingham), Limited).

MR. N. A. ENTICKNAP, joint secretary of the General Electric Company, Limited, has died suddenly. He was 57.

Vickers' Post-war Programme

Capitalisation of Reserves Ruled Out

Sir Archibald A. Jamieson, chairman of Vickers, Limited, told shareholders at the annual meeting of the company on May 14 that 1947 had been a year of progress, which included a geographical spread of the company's activities, and a widening in the range of its commercial products. The company was well into its stride in its general post-war programme, and he considered the immediate phase of its post-war programme as being more or less complete. Armament manufacture at the end of 1947 absorbed only 15 per cent. of productive wages.

"I should like to take this opportunity," said Sir Archibald, "of telling the stockholders that in our opinion the correct procedure at this time would have been to capitalise £6,157,742 of our general reserve, and so restore the nominal value of each ordinary stock unit to £1. This, I repeat, would be the logical and fair thing to do, but your directors have decided against taking such a step at this time. For this action would necessitate paying over to the Government a sum in cash which, in any case, could not be less than £600,000, as a fine for carrying through a perfectly sensible and logical book-keeping entry. In the opinion of the directors this money can be much better spent in improving or expanding your assets, and I, personally, cannot believe that such an illogical and unjust imposition can be continued for any length of time."

Capitalisation of reserves being ruled out for the time being, Sir Archibald said that he would have liked to have recommended an increase in dividend; in ordinary circumstances such an increase would have been justified by the results, but that could not be considered prudent or patriotic in the circumstances.

Plant Extensions by Colvilles

Large Capital Expenditure

In his statement accompanying the annual report of Colvilles, Limited, Sir John Craig, the chairman, gives the following analysis of each £ of sales:—Purchased materials and services, 10s. 5d.; wages, salaries and superannuation, 5s.; rents, rates, insurance, etc., 2s. 2d.; taxation, 1s. 5d.; depreciation, 6d.; transfers to reserve, 3d.; dividends, 2d.; carry forward, 1d.

Sir John states that authority has been received to build coke ovens at the Clyde Iron Works. The third blast furnace at that works was put into operation early this year with supplies of coke from outside sources. The new coke ovens will obviate this necessity, the National Coal Board having given the assurance that supplies of coking coal will be made available as required.

Additional melting plant is planned at Clydebridge, while extensive additions to the plant at Dalzell and Lanarkshire Works are proposed. "If these plans develop along the lines which we have proposed, it will involve large capital expenditure and the directors are now giving careful consideration to the financial aspect of this matter," Sir John states.

Pig-iron and Steel Production in Great Britain

The following particulars of pig-iron and steel production in Great Britain have been extracted from the Statistical Bulletin for April, 1948, issued by the British Iron and Steel Federation. Table I gives the production of pig-iron and ferro-alloys in March, with the number of furnaces in blast at the end of the month; Table II, production of steel ingots and castings in March, and Table III, deliveries of non-alloy and alloy finished steel. Table IV summarises steel industry activities durnig the six months ended March, 1948.

TABLE I.—*Weekly Average Production of Pig-iron and Blast-furnace Ferro-alloys, March,* 1948. (*Thousands of Tons.*)

District.	Furnaces in blast, 3.4.48.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total incl. direct Castings.
Derby, Leics., Notts, Northants, and Essex	25	0.2	14.2	21.7	1.7	—	37.9
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Ches. / Yorkshire (incl. Sheffield, excl. N.E. Coast)	6	—	7.0	—	—	1.4	8.4
Lincolnshire	14	—	24.2	—	—	—	24.2
North-East Coast	26	7.9	37.4	0.5	—	1.2	47.0
Scotland	9	0.7	10.8	2.8	—	—	14.3
Staffs., Shrops., Worcs., and Warwick	8	—	8.1	1.4	—	—	9.5
S. Wales and Monmouthshire	7	3.7	19.7	—	—	—	23.4
North-West Coast	7	13.6	—	0.2	—	0.4	14.2
Total	102	26.1	121.4	26.6	1.7	3.0	178.9*
February, 1948	102	26.0	118.4	26.7	2.3	2.9	176.3
March, 1947	92	18.6	81.0	20.0	1.7	1.8	123.1

TABLE III.—*Weekly Average Deliveries of Non-alloy and Alloy Finished Steel.* (*Thousands of Tons.*)

Product.	1947.§ (53 weeks)	1948 (1st 3 months).	1947.	1948.	
			Mar.	Feb.§	Mar.*
Non-alloy Steel :—					
Heavy rails and sleepers	7.6	9.2	7.4	9.2	9.2
Heavy and medium plates	31.6	36.5	25.8	37.3	37.8
Other heavy products	31.8	35.7	28.1	36.6	35.7
Light rolled products (excl. wire rods and alloy steel bars)	49.7	56.4	49.2	58.0	57.3
Ferro-concrete bars	3.2	3.9	2.7	4.2	4.3
Cold-rolled strip	4.6	4.7	4.7	4.9	4.3
Bright steel bars	4.8	5.9	5.1	6.2	5.0
Sheets, coated and uncoated	24.3	26.3	22.2	27.2	24.6
Tin, terne and blackplate	12.1	13.8	9.9	13.7	13.6
Tubes and pipes	13.5	14.8	12.6	14.5	14.9
Steel wire	10.8	11.5	10.7	12.9	11.6
Tyres, wheels and axles	3.5	3.7	3.5	4.0	3.8
Forgings	5.0	5.6	4.7	5.4	6.1
Castings	3.0	3.4	2.9	3.4	3.7
Total	205.5	231.4	189.5	237.5	231.9
Alloy Steel† :—					
Plates	—	—	—	—	—
Tubes and pipes	0.3	0.5	0.3	0.6	0.5
Bars, sheets, strip and wire	3.7	4.3	3.3	4.4	4.3
Forgings	1.8	2.2	1.4	2.5	2.2
Castings	0.6	0.7	0.6	0.7	0.6
Total	6.4	7.7	5.6	8.2	7.6
Total U.K. production‡	211.9	239.1	195.1	245.7	239.5
Less Intra-industry conversion	19.0	25.0	15.9	26.6	23.6
Total U.K. deliveries	192.9	214.1	179.2	219.1	215.9
Add Deliveries of imported finished steel	2.2	2.1	—	2.1	2.6
Total deliveries of finished steel	195.1	216.2	179.2	221.2	218.5

* Five weeks.
† Excludes high-speed steel.
‡ Includes finished steel made from imported ingots and semi-finished steel.
§ Revised.

TABLE II.—*Weekly Average Production of Steel Ingots and Castings in March,* 1948. (*Thousands of Tons.*)

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derby, Leics., Notts., Northants and Essex	—	—	(Basic) 8.7	1.2	0.2	9.6	0.5	10.1
Lancs. (excl. N.W. Coast), Denbigh., Flints, and Ches. / Yorkshire (excl. N.W. Coast and Sheffield	1.3	21.0	—	0.5	0.4	22.3	0.9	23.2
Lincolnshire	—	29.6	—	—	0.1	29.6	0.1	29.7
North-East Coast	2.0	57.4	—	0.7	0.4	59.2	1.3	60.5
Scotland	4.3	36.7	—	1.7	0.7	41.7	1.7	43.4
Staffs., Shrops., Worcs. and Warwick	—	13.4	—	0.6	0.7	13.5	1.2	14.7
S. Wales and Monmouthshire	8.9	46.8	(Basic) 5.2	0.8	0.1	61.6	0.2	61.8
Sheffield (incl. small tonnage in Manchester)	8.9	24.1	—	7.0	0.6	39.0	1.6	40.6
North-West Coast	0.5	2.3	(Acid) 3.8	—	0.1	6.6	0.1	6.7
Total	25.9	231.3	17.7	12.5	3.3	283.1	7.6	290.7*
February, 1948	27.1	228.5	17.4	12.9	3.5	281.2	8.2	289.4
March, 1947	18.7	152.3	11.9	10.0	3.1	189.2	6.8	196.0

(*Continued at foot of facing page.*)

Increases of Capital

Details of increased capital have been announced by the following companies:—

FOOD ENGINEERING, LIMITED, London, E.C.3, increased by £4,900, in £1 ordinary shares, beyond the registered capital of £100.

JOHN LYSAGHT'S BRISTOL WORKS, LIMITED, increased by £50,000, in £1 ordinary shares, beyond the registered capital of £500,000.

CARLAND ENGINEERING, LIMITED, London, E.C.2, increased by £15,000, in £1 ordinary shares, beyond the registered capital of £5,000.

CLARENDON ENGINEERING COMPANY, LIMITED, Leicester, increased by £25,000, in 1s. "B" shares, beyond the registered capital of £50,000.

PUDSEY WELDING COMPANY, LIMITED, Pudsey, Yorks, increased by £500, in £1 ordinary "A" shares, beyond the registered capital of £2,000.

BRITISH THOMSON-HOUSTON COMPANY, LIMITED, increased by £2,000,000, in £1 ordinary shares, beyond the registered capital of £4,000,000.

R. W. WEBSTER & COMPANY, LIMITED, engineers, etc., of Waltham Cross, Herts, increased by £5,000, in £1 ordinary shares, beyond the registered capital of £10,000.

MARKMASTER, LIMITED, designers and manufacturers of machinery, etc., of London, W.C.2, increased by £2,000, in £1 shares, beyond the registered capital of £1,000.

EVANS, THOMPSON & COMPANY, LIMITED, engineers and hollow-ware manufacturers, etc., of Loughborough, increased by £2,400, in £1 ordinary shares, beyond the registered capital of £1,600.

WALKER BROS. (WIGAN), LIMITED, engineers, etc., increased by £150,000, in £1 ordinary shares, beyond the registered capital of £100,000. At December 17, 1947, Walmsley (Bury), Limited, held a majority of the issued shares.

JOHNSON FOUNDRIES, LIMITED, Stockport, increased by £10,000, in 100 redeemable first preference, 200 redeemable second participating preference, and 700 ordinary shares of £10, beyond the registered capital of £5,000.

SAMUEL HODGE & SONS, LIMITED, mechanical engineers, boiler manufacturers, etc., of London, S.W.1, increased by £50,000, in £1 4½ per cent. cumulative redeemable preference shares, beyond the registered capital of £100,000.

A. & W. H. BURY (DARWEN), LIMITED, engineers, etc., of Darwen, increased by £18,000, in £1 ordinary shares, beyond the registered capital of £2,000. At July 4, 1946, the Oxley Engineering Company, Limited, held 1,250 shares of £1 out of 2,000 issued.

CHURCHILL-REDMAN, LIMITED, iron and brass founders, etc., of London, S.E.11, increased by £200,000, in 100,000 preference shares of £1 and 200,000 ordinary shares of 10s., beyond the registered capital of £50,000. Charles Churchill & Company, Limited, held the greater part of the issued share capital.

BRADLEY & COMPANY, LIMITED, galvanised, wrought and stamped hollow-ware manufacturers, etc., increased by £755,000, in 400,000 5 per cent. cumulative preference £1 shares and 7,100,000 ordinary 1s. shares, beyond the registered capital of £45,000. The 40,000 preference and 5,000 ordinary £1 shares in the original capital have been converted into ordinary 1s. shares.

COWLISHAW, WALKER & COMPANY, LIMITED, Railway Engineering Works, Biddulph, Stoke-on-Trent, increased by £100,000, in 1s. ordinary shares, beyond the registered capital of £50,000. At July 24, 1947, Norton & Biddulph Collieries, Limited, held practically the whole of the issued share capital of 28,000 ordinary shares of £1 and 40,000 deferred shares of 1s. All shares have now been converted into ordinary shares of 1s.

MR. JOHN WILLCOCKS, who retired recently from the position of general secretary of the Ship Constructors' and Shipwrights' Association, has died.

ATTACKING THE Government's policy of wage freezing, Mr. J. Gardner, general secretary of the Amalgamated Union of Foundry Workers, in his annual report, states that it destroys the main incentive for increased production. Sir Stafford Cripps has neither reduced prices nor profits, and unless there is such a reduction, any freezing of wages will be bitterly resented by the great mass of working people. A higher standard of living and better working conditions would supply the incentive for greater effort.

PIG-IRON AND STEEL PRODUCTION IN GREAT BRITAIN. (*Continued from previous page.*)

TABLE IV.—*General Summary of Pig-iron and Steel Production.* (*Weekly Average in Thousands of Tons.*)

Period.	Iron ore output.	Imported ore consumed.	Coke receipts by blast-furnace owners	Output of pig-iron and ferro-alloys.	Scrap used in steel-making.	Steel (incl. alloy)			Steel Stocks.†
						Imports.	Output of ingots and castings.	Deliveries of finished steel.	
1938	228	89	—	130	118	16	200	—	—
1946	234	115	169	149	147	8	244	192	1,068
1947 (53 weeks)	209	130	165	147	145	8	240	195	797
1947—October*	226	145	175	161	166	5	275	210	789
November ..	225	154	186	166	164	8	273	214	775
December* ..	224	149	188	165	145	6	243	196	797
1948—January	239	154	196	168	169	4	281	208	777
February	246	164	198	176	174	5	289	221	749
March*	243	169	192	179	175	7	291	219	780

* Five weeks. † Figures now relate to stocks at the end of the years and months shown.

Company News

(Figures for previous year in brackets.)

Briggs Motor Bodies—Dividend of 12½% (10%).

Turner & Newall—Interim dividend of 3¾% (same).

Plessey Company—Interim dividend of 10% (same).

Goodlass Wall & Lead Industries—Dividend of 15% (same).

Harrison (Birmingham)—Dividend of 25%, tax free (same).

Marco Refrigerators—Interim dividend of 12½% (7½%).

Marshall, Sons & Company—Interim dividend of 3¾% (same).

John I. Thornycroft & Company—Interim dividend of 5% (same).

General Engineering Company (Radcliffe)—Dividend of 20% (same).

Minerals Separation—Final dividend of 35% (30%), making 45% (40%).

Specialloid—Payment of the preference dividend due on May 15 has been deferred.

Atlas Steel Foundry & Engineering Company—Interim dividend of 15% (same).

Ozonair—Profit for 1947, £4,482 (£6,052); dividend of 8½% (same); forward, £3,058 (£2,641).

Sydney S. Bird & Sons—Final dividend of 15% (30%) on increased capital, making 30% (same).

Braid Bros.—Interim dividend of 7½% on the £300,000 of ordinary stock (7½% on £100,000 stock).

Permutit Company—Dividend of 10% and bonus of 2½% on £200,000 ordinary capital (same on £100,000 capital).

A.P.V. Company (formerly the Aluminium Plant & Vessel Company)—Final dividend of 33⅓%, making 50% (same).

Light Production Company—Dividend of 10% for the 11 months to March 31, 1948 (same for the previous 12 months).

Associated Automatic Machine Corporation—Dividend of 6% for the nine months to December 31, 1947 (same for the previous year).

Ransomes, Sims & Jefferies—Dividend of 7½% on the £750,000 ordinary stock (7½% on £500,000 stock and 2½% on £250,000 new stock).

Hammond Lane Foundry Company—Profit for 1947, after tax, etc., £12.764; final dividend of 7%, making 10%, and bonus of 2½%; forward, £6,600 (£6,323).

William Baird & Company—Final dividend of 11%, making 15% for the period June 1 to December 31, 1947; final dividend of 11% and special bonus of 5%, making 20%.

Morris Motors—Gross earnings for 1947, £3,415.022 (£3,597,957); other income, £89,398 (£87.073); final dividend of 14½% (12%), making 24½% (22%), tax free (same); bonus, nil (2½%, tax free); forward, £262,579 (£287,296).

Sheffield Twist Drill & Steel Company—Dividend at the rate of 33⅓% per annum for the period October 2 to December 31, 1947, which represents 4d. gross per 4s. unit, or 8⅓%. The company was made public in December, 1947.

Climax Rock Drill & Engineering Works—Net profit for 1947, £62,886 (£58,433, including £15,000 E.P.T. refund); tax, £34,500 (£25,500); ordinary dividend of 12½% (same); to reserve, £15,000 (same); forward, £16,047 (£15,711).

Anderston Foundry Company—Final dividend of 12½%, making 15% (same), plus 4⅛%, tax free, bonus from investments reserve (50%, tax free, from accumulated profits and 4⅛%, tax free, from gains realised from sale of capital investments).

Range Boilers—Trading profit for 1947, including dividends from subsidiaries, £62,349; to directors' fees, £500 (same); net profit, £61,849 (£29,233); final dividend of 15%, making 20% (same); general reserve, £40,000 (£14,000); forward, £19,280 (£8,211).

Hudson & Wright—Net profit, after tax, depreciation, etc., £40,860 (£20,671); to stock reserve, £15,000 (nil); general reserve, £10,000 (£5,000); dividend of 40%, £14,300 (£10,725); forward, £12,959 (£11,399). The company was made public in June, 1947.

Charles Clifford & Son—Trading profit, including income from investments for 1947, £153,741 (£72,258); to taxation, £93,000 (£34,000); net profit, £48,231 (£25,748); dividend of 3s. 6d. per share, tax free (same); general reserve, £30,000 (£10,000); forward, £42,666 (£35,925).

A.C.E. Machinery—Trading profit to September 30, 1947, £18,540 (£23,445); to depreciation, £2,491 (£2,234); fees, £366 (£387); income tax, £6,013 (£9,212); N.D.C. and profits tax (including £1,350 tax on proposed dividend), £2,804 (£1,004); dividend of 15% (same); forward, £12,657 (£10,741).

Richard Johnson & Nephew—Net profit for the year ended March 31, after depreciation, taxation, etc., £127,930 (£137,784); to plant obsolescence reserve, £30,000 (£35,000); general reserve, £35,000 (£50,000); pension and life assurance fund, £25,000 (£15,000); dividend of 15% (same); forward, £50,289 (£48,659).

Banks & Davis—Trading profit to March 31, £33,557 (£21,103); interest. etc., £203 (£208); to depreciation, £208 (£234); directors' fees, £500 (£449); management remuneration, £1,318 (£1,249); fees, £500 (£277); profits tax, £5,700 (£6,652); income tax, £11,365 (£6,297); final dividend of 25% (50%), making 100% (same); forward, £27,072 (£19,045).

Gaskell & Chambers—Net profit for 1947, £46,037 (£67,858); reserves for taxation not required, £25,957; final dividend of 25% (20%), making 30% (same, including jubilee bonus of 5%); directors' fees, £1,550 (£900); general reserve, £25,000 (£5,000); building reserve, £10,000 (nil); stock depreciation reserve, nil (£20,000); forward, £59,826 (£41,698).

National Electric Construction Company—Revenue during 1947, £89,463 (£66,771); to management expenditure, £3,115 (£4,063); directors' and audit fees, £1,242 (same); tax, £40,400 (£23,500); profit, £44,706 (£37,966); dividend of 10% (same); balance of £34,531 to be added to undivided profits account; net profit on sale of investments of £3,804 has been placed to capital profits account.

Simms Motor Units—Trading profit, £42,269 (£73,966); to depreciation, £23,085 (£19,949); deferred repairs, nil (£3,500); fees, £1,000 (£1,128); balance, £18,184 (£49,389, plus £8,135 freed tax provisions); to taxation, £12,000 (£16,700); repairs, to 1945, nil (£6,500); dividend reserve, nil (£5,000); dividend of 5% (10%); directors' "extras," nil (£744); forward, £23,728 (£28,544).

Federated Foundries—Combined profit and loss account for 1947 shows trading profit, £282,426 (£187,796); to depreciation, £63,921 (£60,556); directors' fees, £369 (£400); tax, £156,441 (£85,184); net profit, £61,695 (£41,656); to goodwill reserve, nil (£5,000); additional depreciation reserve, nil (£7,500); general reserve, £20,000 (nil); dividend of 5% (3¼%); forward, £54,631 (£46,292).

Colvilles—Trading profit for 1947, after tax, deferred repairs and contingencies, £732,879 (£750,821); dividends from subsidiaries (net), £108,012 (£102,875); from provision for tax, 1939-45 no longer required. £150,000 (nil); to depreciation and obsolescence, £400,000 (same); general reserve, £200,000 (nil); 5½% preference dividend, £60,500 (£59,125); ordinary dividend of 13% (8%); directors' fees, £1,500 (same); forward, £667,062 (£618,419).

Sturtevant Engineering Company—Profit for 1947, after taxation, including dividend from a subsidiary company, £41,301 (£35,649); provision for taxation no longer required, £15,000 (nil); proceeds of sale of land, nil (£7,369); to building reserve, £10,000 (same); general reserve, £10,000 (nil); written off goodwill, £12,999 (nil); rehabilitation reserve, nil (£10,000); final dividend of 11%, making 16½%, tax free (same); forward, £18,941 (£15,981).

Vosper—Net trading profit to August 31, 1947, £45,749 (£47,803); interest on war damage claim for year, £598 (nil); to bank interest and charges, £10,191 (£11,318); depreciation, £10,567 (£10,562); directors' fees, £1,750 (£1,900); other fees and charges, £954 (£898); net profit, £22,885 (£23,125); interest on war damage claim for period to August 31, 1946, £3,372 (nil); to tax, £15,101 (£13,701); dividend of 10% (same); forward, £26,786 (£22,505).

C. A. Parsons & Company—Trading profit for 1947, £390,980 (£306,585); dividends and interest, £3,897 (£2,647); fees, £28 (nil); to directors' remuneration, £16,155 (£15,192); interest, £34,202 (£29,858); fixed assets depreciation, £62,451 (£49,764); contingencies, £45,000 (nil); income and profits tax, £97,500 (£83,000); net profit, £139,597 (£131,418); to preference dividend, £7,410 (nil); final ordinary dividend of 7½%, making 12½% (same); general reserve, £100,000 (£112,500); forward, £103,586 (£112,649). The company was made public in May, 1947.

New Companies

("Limited" is understood. Figures indicate capital. Names are of directors unless otherwise stated. Information compiled by Jordan & Sons, 116, Chancery Lane, London, W.C.2.)

Brownhills Smelters, Midland Tar Works, Lichfield Road, Brownhills, Staffs—£20,000.

J. Frankel (Aluminium), Alma Road, Wednesbury, Staffs—£25,000. J. and H. Frankel.

Metaltreat, 359, Canal Road, Bradford, Yorks—£30,000. M. G. Burrows and J. C. Armitage.

Trafalgar Foundry, Halifax Chambers, High Street, Coventry—£5,000. G. V. Keeling and A. L. Dent.

Barronia Metals (Great Britain), Widemarsh Street, Hereford—£10,000. F. J. Bullen and L. N. Roberts.

Derbyshire Refractories—£60,000. J. D. Penrose, Sutton Rock, Sutton Scarsdale, Chesterfield, subscriber.

Sterling Moulding Materials, 74, Victoria Street, London, S.W.1—£5,000. R. Sternberg and G. E. Titley.

John Orton Foundry Company, Greyfriars Road, Ipswich—£5,000. E. C. Tetsall, H. C. Driver, and F. Pryke.

Boro' Foundry, Railway Street, Lye, near Stourbridge—£10,000. J., W., F., I., and H. J. Taylor, and W. Pyke.

Greens Aluminium Foundries, 31, Priestgate, Peterborough—£4,000. C. F. Green, R. J. Croft, and E. Handson.

Unitech (Engineers), Central House. 75, New Street, Birmingham—£2,000. J. W. E. and J. D. Aidney, and A. C. Powis.

Rifkin Bros. (Liverpool), 5-17, Carruthers Street, Liverpool—General scrap-iron and metal merchants, etc. £5,000. H., I., and D. Rifkin.

H. W. Pope & Company, 482, New Cross Road, London, S.E.14—Manufacturers of forgings, castings, etc. £3,000. C. H. and M. E. Pope.

Foundry Mechanisations (Baillot), 19, Victoria Street, London, S.W.1—£15,000. A. J. Baillot, B. J. B. and A. G. Corrie, L. J. Tichelly, and J. G. D. Nicolas.

Bamforth, Garside & Company, Hoyle Ing Iron Works, Linthwaite, near Huddersfield—Ironfounders and engineers. £8,000. W., H., and F. Bamforth, and K. Hartley.

John G. Sutherland & Sons, Union Meter Works, Heneage Street, Birmingham—Manufacturers of gas meters. £5,000. I. G. Sutherland, W. D. Wilson, W. A. Dobson, and G. E. Withers.

T. Redmayne & Company, Hallamshire Foundry, Little London Road, Heeley, Sheffield—Ironfounders, iron, steel, and metal merchants, etc. £6,000. G. and B. M. Redmayne, R. H. Hurst, and H. Brown.

THE INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED, earned 68 cents a share on Common stock in the first quarter, against 65 cents in the preceding quarter and 51 cents in the first quarter of 1947.

News in Brief

THE BRITISH ELECTRIC TRANSFORMER COMPANY, LIMITED, celebrated its jubilee on May 10.

WORK HAS BEEN STARTED on additions to the works of the Skinningrove Iron Company, Limited, Saltburn.

FURNESS SHIPBUILDING COMPANY, LIMITED, Haverton Hill-on-Tees, has received orders for two large tankers for Swedish owners.

AUTOMATIC TELEPHONY has been admitted to a new sphere by the Admiralty decision to instal a G.E.C. automatic telephone exchange in an aircraft carrier.

SINGER MOTORS, LIMITED, in conjunction with the Camley Engineering Company, Limited, Leeds, has agreed to produce refrigerators for the export market at the Singer works in Birmingham.

GLASGOW CORPORATION has placed contracts for malleable-iron fencing with James Robertson & Company (Glasgow), Limited, and P. & R. Fleming & Company, to the value of £2,129 and £470 respectively.

GUEST, KEEN & NETTLEFOLDS, LIMITED, is seeking powers to repay its 4 per cent. debenture stock at 102 per cent. in cash with an option to the stockholders to convert into a new 4½ per cent. third cumulative preference £1 share at the rate of 97 of such shares for each £100 of debentures.

THE DIRECTORS OF W. Canning & Company, Limited, electro-platers' engineers, of Birmingham, propose to capitalise part of the reserves and to make a free bonus issue equivalent to 100 per cent. The basis of distribution proposed is one 5s. 5 per cent. non-cumulative preference for each 5s. ordinary. Treasury sanction to the issue has been obtained.

MR. JOHN FREEMAN, Joint Parliamentary Secretary to the Minister of Supply, speaking at the conference of the Electrical Trades Union, said that the time was not far ahead when gas turbine engines would replace steam in electrical generating plants. The new form of power should be cheaper and quicker and help to compensate this country for its lack of hydraulically generated power, he said.

H.M.S. DUNBAR, a minesweeper of 650 tons displacement, built by the Blyth Dry Docks & Shipbuilding Company, Limited, six years ago, has been allocated to Pollock Brown & Company, Limited, Southampton, for breaking up. The British Iron & Steel Corporation (Salvage), Limited, has been informed that H.M.S. Titania, a submarine depot ship of 5,250 tons standard displacement, is available for disposal.

THE NUFFIELD GROUP is to undertake the manufacture of tractors. Some months ago it was announced that the group was not proceeding with the manufacture of the Nuffield tractor owing to the shortage of raw materials. In the annual report of Morris Motors, Limited, Lord Nuffield says that to amplify the production of tractor castings the company has acquired a foundry at Wellingborough, previously owned by Thomas Butlin & Sons, Limited, a subsidiary of the United Steel Companies, Limited.

Production of Fuel-saving Appliances

Chancellor's Reaction to Sub-committee's Report

The Parliamentary and Scientific Committee recently submitted a report to the Chancellor of the Exchequer and the Minister of Fuel and Power urging that higher priority should be given for steel required for the manufacture, repair and maintenance of fuel-saving appliances, particularly in the industrial sphere. In a letter to Mr. Raymond Blackburn, M.P., chairman of the Coal Utilisation Sub-committee of the Parliamentary and Scientific Committee, Sir Stafford Cripps states that the report has been studied by the Ministry of Fuel and Power.

Sir Stafford says he quite accepts the necessity for keeping up the production of fuel-saving appliances. Additional allocations of steel would present a great problem in our present straitened circumstances, and he gathers that in any case the immediate trouble is that there is a shortage of ancillary equipment. Under the present priority arrangements, the F.M.I. symbols are not being used, and consequently he has asked the Ministry of Fuel and Power to arrange with the Ministry of Supply, the production authority concerned with such equipment, that it should see what specific help can be given in those cases where delivery of complete equipment is now being delayed. "We shall have to see what result this has before taking further steps," the Chancellor continues.

"So far as the gas industry is concerned, I am glad to be able to tell you that some increase in the allocation of steel has already been made—though it is not possible to go to the lengths which are referred to in the Paper. But here, again, we have gone so far as it is possible to do without our present steel supplies."

The report of the Coal Utilisation Sub-committee assumed that an annual saving of some 18,000,000 tons of coal might be achieved if the full programme of re-equipping industry with up-to-date fuel-burning appliances were carried out. It also assumed that another million tons of coal could be saved annually if better facilities were available to the gas industry for the repair, reconstruction and maintenance of existing plant.

Recent Wills

DIXON, JAMES, governing director of James Dixon, Limited, boiler manufacturers, of Burnley £46,343

CLARK, A. E., partner of John H. Clark & Company, ironfounders, etc., of Tottenham, London, N.15 ... £17,290

RIMMER, ROBERT, formerly managing director of Roger Bolton & Son, Limited, brassfounders, of Wigan £10,395

PROBERT, JOHN, of Macclesfield, for over 40 years representative of Newton Chambers & Company, Limited £2,334

HOULDSWORTH, SIR HENRY H., a former director of the Coltness Iron Company, Limited, and other companies £127,269

THE MODERN PIG

IF YOU WANT...
clean iron, free from sand, free from sows ...uniform analysis... convenient size...easy handling... specify STANTON
MACHINE CAST PIG IRON

SPECIFICATION

WEIGHT	80-90 lbs.
Length	22 inches
Width	8½ inches
Thickness	3¼ inches

(at notch 2¼ inches).

Made in our well-known
STANTON, HOLWELL & RIXONS BRANDS

THE STANTON IRONWORKS COMPANY LIMITED NEAR NOTTINGHAM

Raw Material Markets

Iron and Steel

Current production of pig-iron having overtaken the needs of the steel plants, it is hoped that it may soon be possible to provide ampler tonnages for the foundries. The position at the steelworks, of course, does not justify complacency. Stocks of basic iron are unusually low and will have to be replenished as opportunity arises. But foundrymen require more iron for their day-to-day requirements. Their allocations are less than their needs and, at times, deliveries fall short of full quotas. High-phosphorus iron, the staple raw material of the light-castings trade, is very scarce, but low- and medium-phosphorus iron is also in short supply and users often have to substitute hematite or refined iron for the production of engineering and speciality castings.

British steelmakers are turning out substantial tonnages of heavy billets, blooms and slabs, and good supplies are reaching the re-rolling mills, notwithstanding the meagre tonnages imported by the Control. The deficiency in the supply of small billets, flats and squares, however, still persists and adversely affects the production of small bars and narrow strip at a time when these materials are urgently needed. Sheetmakers, too, are constantly pressing for prime bars and, as these are by no means plentiful, defective sheet bars command a ready sale. Similarly, strip and wire mills are handicapped by a scarcity of suitable material.

Apart from swollen home industrial demands, overseas consumers are exercising increasing pressure for the supply of plates and sheets of all sizes. Still more extensive export inquiries are circulating, but these can only be satisfied at the expense of the interests of important home industries. On the whole, the mills are keeping well abreast of their commitments for Period II, but bookings are already coming forward for the third quarter. Shipbuilding, railway and colliery requirements are particularly heavy and the call for special and carbon steels for agricultural-implement works continues to expand.

Non-ferrous Metals

The American Copper Institute has published its usual figures for copper production during the month of April, and if these are perhaps slightly below the standard for March, there is not a great deal of change. There was a gain of some 4,600 tons in the output of crude copper, which was returned at 88,235 short tons, but production of refined metal came down from 110,886 short tons in March to 104,044 tons last month. Deliveries to domestic consumers fell by more than 6,000 tons to 116,475 short tons, while stocks of refined copper were about 1,300 tons down at 67,175 tons. On the whole, it can be said that at present there is really no sign of the setback in American activity which has threatened to develop in the past. The speedy realisation of E.R.P. has improved sentiment on both sides of the Atlantic, for Europe's buying power is being rejuvenated. So far as copper is concerned, the question of stockpiling plays a most important role, and there is a good deal of doubt about how things are working out in America. The generally accepted view is that, so far, little or nothing has been put to reserve on this account, and it is obviously going to be some time before the tonnage assumes worthwhile proportions, owing to the very high rate of consumption. In the monthly figures issued by the Copper Institute, the outgoing figure is for deliveries, not consumption, but this usage figure is given in due course and it will be found that there is not much to choose between total deliveries and total consumption.

The April copper consumption figure in the United Kingdom may show a small improvement over March, but, broadly speaking, the trend of usage in this country is not upwards. Rather the reverse, for pointers are not lacking to suggest that demand is declining and may continue to do so as the year goes on. At any rate, there is little fear that the trade will suffer from being restricted to 30,000 tons monthly and present indications are that the Government, having provided cover at that rate, will probably have a surplus by the year-end. The spur of acute scarcity is now a thing of the past and the public is no longer interested in buying something just for the sake of buying; this applies to consumers of copper also, for in the U.S. the price has now gone over 22 cents, f.a.s. New York.

Obituary

MR. THOMAS JOHNSTON, formerly of Bruntons (Musselburgh), Limited, died on May 11.

MR. FRANCIS W. E. PRATT, managing director of Air Pumps, Limited, West Wimbledon, London, S.W.20, died suddenly on May 17.

MR. ROBERT HOWIE, who died on May 16, was the proprietor of Robert Howie & Company, ironfounders, railway-chair manufacturers, of Kilwinning, Ayrshire.

MR. T. O. ARNFIELD, who has died at the age of 66, was a director of Arundel, Coulthard & Company, Limited, textile machinists, foundrymen, etc., of Stockport.

LT.-COL. W. S. F. TETLOW, who was a director of the Chadwick Machine Company, Limited, Cleckheaton, has died in a Leeds nursing home at the age of 43.

Gazette

ELASTIC METALLIC PACKING & ENGINEERING COMPANY, LIMITED, is being wound up voluntarily. Mr. J. E. Robson, 57, Grainger Street, Newcastle-upon-Tyne, is the liquidator.

LLEWELLYNS (PLANT SERVICES), LIMITED, is being wound up voluntarily. Mr. D. D. Williamson, 3, Drapers Gardens, Throgmorton Avenue, London, E.C.2, is the liquidator.

WILCOCK & JONES, LIMITED, puddled-iron makers, etc., of Rotherham, is being wound up voluntarily. Mr. T. Shaw, Stoney Middleton Hall, Stoney Middleton, Derbyshire, is the liquidator.